
DRAFT EXECUTIVE SUMMARY

**NORFOLK HARBOR AND
CHANNELS, VIRGINIA**

**LONG-TERM DREDGED
MATERIAL MANAGEMENT
(INNER HARBOR)**



**US Army Corps
Of Engineers**

Norfolk District
June 1990

DRAFT EXECUTIVE SUMMARY

As Hampton Roads looks to the arrival of the 21st century, it is clearly blessed with a port economy which is vibrant. In large measure, this vibrancy depends upon regular maintenance of the port's navigation arteries. Periodic dredging requires management of material taken from the numerous channels, anchorages, piers, terminals, and other areas making up the port complex. Continuing vital dredging, maintaining appropriate depths, and preserving the port's economic health were all concerns which prompted a 1986 request from the Commonwealth of Virginia for the conduct of this study. The report which has been prepared presents a summary of numerous investigations on how the Craney Island Disposal Area could be replaced when its filling (estimated to occur about 1997) is complete. The report has been prepared with the benefit of regular dialogue with the Commonwealth, with the goal that it assist in deliberations on the complex matter of replacing Craney Island. In evaluating the choices available and making the decision, the Commonwealth will have to balance economic and environmental issues with competing regional and social concerns of all groups which will be affected. Therefore, the report reflects consideration of all known issues which the Commonwealth will evaluate.

Since 1957, the Federally-authorized dredged material placement area at Craney Island has served as the main receiving site for material generated by new work and maintenance dredging from the inner harbor, i.e. that portion of Norfolk Harbor west of the Hampton Roads Bridge Tunnel. For many large jobs within the harbor, consisting of several hundred thousand cubic yards or more, Craney Island is close enough that hydraulic pipeline dredges have been used. With the efficiency of being able to pump material directly into the site, Hampton Roads has enjoyed some of the lowest dredging and placement costs in the country. Approximately 182 million cubic yards of dredged material have been deposited in Craney Island (through September 1989). The area's original capacity of 100 million cubic yards has been extended through appropriate management practices including dewatering, trenching, and raising of levees. By 1997, when the site is filled, it will have received about 200 million cubic yards.

As stated, a number of alternatives have been evaluated for management of dredged material from Hampton Roads. Some were identified during the public meetings which were held and from the correspondence which has been received. Some were developed during the dialogue process with the Commonwealth. Other alternatives were identified during the regular coordination between the various Federal and state environmental agencies as well as port and maritime groups. Still other ideas were identified by the various members of the study team which has studied the problem for the past several years. Each alternative has been carefully considered. Combinations of alternatives have also been considered. The various plans considered include the following (refer to map included as a part of this Executive Summary):

Plans considered within inner harbor:

- Raising Craney Island.
- Removing dredged material from Craney Island.
- Expanding Craney Island.
- Confined site in Willoughby Bay.
- Confined site in Hampton Flats.
- Confined site in Ragged Island.
- Placing material alongside channels.

Plans considered in Chesapeake Bay:

- Confined site off Ocean View.
- Confined site in the Horseshoe Area off Buckroe Beach.
- Confined site adjacent to the Chesapeake Bay Bridge Tunnel.

Plans considered in inland areas:

- Confined site in Suffolk.
- Truck haul to abandoned borrow pits.
- Rail haul to abandoned mining pits.

Plans for open ocean management:

- Placement of clean material in Dam Neck Ocean Management Site (37 miles from Craney Island) plus unsuitable material into existing Craney Island.

- Placement of clean material in Norfolk Management Site (45 miles from Craney Island) plus unsuitable material into existing Craney Island.
- Discharge of dredged material via permanent pipeline to sea.
- Capping unsuitable material after placement.

Beneficial use of dredged material should be included as part of any long term management strategy. This could include beach replenishment, shoreline erosion protection, use for construction fill material, etc.

The management of dredged material on a large scale and in a developed area such as Hampton Roads may be a sensitive and controversial issue. Each of the above alternatives was evaluated in terms of engineering, economic, environmental, and social impacts. Key evaluation criteria include the following:

- A management area should have a life span of about 50 years. This would require storage for about 250 million cubic yards of material.
- The costs associated with a management area should be minimized.
- The destruction of bottom lands, wetlands, coastal zones, and wildlife resources within the Hampton Roads area should be minimized.
- The adverse social impacts associated with providing a management area should be minimized.

A brief summary of the formulation and evaluation process is included in the table at the conclusion of this Executive Summary. It shows the results of the screening process and indicates that at least two major plans remain for consideration by the Commonwealth. They include the following:

- Expansion of Craney Island to the west and north in six possible configurations, and
- Ocean placement.

For instance, Plan B is the largest extension of Craney Island considered. It could provide the necessary storage for dredged material for about 50 years. It involves construction of a levee around a 2,500-acre site, provision of the necessary bottomland (now owned by the state), and the provision of

appropriate measures to mitigate the environmental impacts. The cost of Plan B (including environmental mitigation) would be approximately \$73 million (1988 dollars). However, the report recognizes that the Commonwealth may want to select an expansion plan for Craney Island with a useful life less than 50 years. For this reason, the report considers five smaller expansion plans. Two of these, identified as Plans A and E, involve confined areas of 1,700 and 1,500 acres and have maximum useful lives of 36 and 26 years respectively while the remaining three expansion plans involve useful lives of 9, 7, and 12 years and are discussed in the report. Only expansion plans A, B, and E are identified in the table for comparative purposes.

Ocean placement is the second major plan and involves (a) barging clean, suitable dredged material to the Dam Neck Ocean Management Site and/or Norfolk Management Site; and (b) placement of material unsuitable for the ocean into the existing Craney Island Management Area. This would provide a management plan with a lifetime in excess of 50 years. No construction would be required and Craney Island would be maintained as it is at present.

In considering the economic aspects of ocean and confined management alternatives, Plans A, B, and E were less expensive than ocean management under all circumstances. Using Federal criteria for the analysis of water resources projects, (with a discount rate of 8 7/8 percent), the sites were anywhere from \$6 to \$10 million a year less expensive than ocean management. Using criteria compatible with financing alternatives available to the Commonwealth (a discount rate of 11 percent), for the construction of Plan A, the difference in cost between that site and ocean management was \$3 million per year. Although the difference in cost varies with the type of analysis (financial versus economic), the fact remains that more total resources are required to implement an ocean management plan than to construct a new confined facility adjacent to Craney Island. WITH ANY OF THE EXPANSION OR OCEAN PLANS CONSIDERED, THE COSTS OF MANAGING DREDGED MATERIAL WILL INCREASE SUBSTANTIALLY OVER WHAT THEY HAVE BEEN WITH THE EXISTING CRANEY ISLAND SITE.

Differences in cost between ocean management and confined sites will vary depending on the method of dredging that a particular maritime interest has used in the past. Those jobs which could be performed by hydraulic dredging and pumped directly via pipeline into Craney Island, will cost more (per cubic yard) when the material must be removed with a bucket dredge and transported by barge to the ocean. On the other hand, the cost of jobs currently performed by bucket dredging with placement in the Craney Island rehandling basin, will be very close to the cost of transporting the material an additional 45 miles to the ocean. This is because the new expansion of Craney Island will require an increase in interest and amortization charges over those for the existing Craney Island, which will offset the additional cost of barging material the extra distance.

In accordance with Federal law, the Commonwealth, as local cost sharing sponsor, must bear the cost of constructing any expansion of Craney Island and the associated operation and maintenance. However, the Commonwealth can recoup a portion of the cost through tolls to the U.S. Navy, private interests, etc. (but not for any material removed during maintenance of authorized channels). The report estimates that 4 to 5 million cubic yards can be expected to be dredged from the inner harbor each year. Approximately 35 to 40 percent is naval and private dredging and is subject to tolls. An additional 15 to 20 percent will be generated by all state agencies.

If the state chooses to use the ocean as a management area, the annual increase in cost for those using hydraulic dredges now to travel the added distance via bucket and scow from a theoretically expanded Craney Island could be substantial. Federal policy has always been to use the least costly, environmentally acceptable alternative. The report findings indicate that expansion of Craney Island is the least costly alternative for the placement of dredged material. Accordingly, the state may need to assume the added cost for maintaining authorized channels, if it chooses the ocean option. *

Environmental considerations will play a very important role in the decision making process. If the state decides to pursue an expansion of Craney Island, the procedural requirements of the National Environmental Policy Act (NEPA) and the Clean Water Act would have to be satisfied. This could be

accomplished by the Corps (through its civil works planning process) or the state (through the regulatory process) and would include a scoping process, preparation of a NEPA document (Environmental Impact Statement), and full agency and public review and coordination. Full compliance with NEPA and the Clean Water Act would then govern a determination on the environmental acceptability of expansion. The Fish and Wildlife Service and the Corps recommend a compensation for the loss of fish and wildlife habitat if an expansion to Craney Island is constructed.

If the state decides on the deposition of clean material into the ocean and unsuitable material into the existing Craney Island, it should not be necessary to provide additional NEPA documentation, since NEPA requirements have already been (or are presently being) fulfilled by the Corps and EPA for these alternatives. However, as required by Section 103 of the Ocean Dumping Act, each placement activity at an approved ocean site would require that a determination of dredged material acceptability be made by the District Engineer. If determined acceptable, a permit would be issued.

A determination of dredged material acceptability for ocean placement would require that EPA/Corps testing procedures be used to evaluate dredged material, and that site use be in conformance with the ocean site management plan as agreed upon by the Corps and EPA. These determinations would be the responsibility of the user as regulated by the Corps. Using the experience of other ports throughout the country as an indicator, a transition to a more extensive ocean placement operation, even with careful planning, will require a period of learning and adjustment.

SUMMARY OF PROJECT FORMULATION SCREENING PROCESS

Plan	Initial Screening	Intermediate screening (a)		Final array of plans
		Cost per c.y. (b)	Comments	
A. <u>PLANS CONSIDERED WITHIN INNER HARBOR</u>				
1. Further raising of Craney Island	Not now technologically feasible to raise level above elevation 30 m.l.w. Eliminated from further screening.			
2. Removing dredged material from Craney Island	Continuous placement into Craney Island, thence transfer to ocean, more costly than transport direct to sea. Eliminated from further screening.			
3. Expanding Craney Island	Six expansion plans of various sizes considered. Adverse social and environmental effects. Retain to evaluate economics.	4.97-5.42	Least costly. Retain Plans A, B and E since others have lives of 5 to 10 years	Retain A, B, and E
4. Willoughby Bay	Short useful life (12 years) for placement of dredged material. Adverse social and environmental effects. Eliminated from further screening.			
5. Hampton Flats	Worked by oystermen, clammers, and other commercial fishermen. A dredged material placement area would present a			

SUMMARY OF PROJECT FORMULATION SCREENING PROCESS

(Cont'd)

Plan	Initial Screening	Intermediate screening (a)		Final array of plans
		Cost per c.y. (b)	Comments	
	high probability of adverse impact on seed oyster beds in James River and hard clam habitat. Serious environmental effects.			
	Eliminated from further consideration.			
6. Ragged Island	Wildlife management area. On list of international importance. Eliminated from further consideration.			
7. Placement of material alongside channels	Maritime developments close to channels. If dredged material were placed along small adjoining areas, possibility of returning to channels requiring redredging frequently. Eliminated from further consideration.			
B. <u>PLANS CONSIDERED IN CHESAPEAKE BAY</u>				
8. Ocean View (offshore)	Loss of clamming areas, benthos, and commercial and recreational boating area. Access to shoreline not disrupted. Retain due to long useful life.	9.29	Eliminated due to high cost plus environmental factors	

SUMMARY OF PROJECT FORMULATION
SCREENING PROCESS
(Cont'd)

Plan	Initial Screening	<u>Intermediate screening (a)</u>		Final array of plans
		Cost per c.y. (b)	Comments	
9. Horseshoe Area off Buckroe Beach (offshore)	Loss of habitat and feeding areas for fish and benthos. Loss of commercial and recreational boating area. Retain due to long useful life.	8.86	Eliminated due to high cost plus environmental factors	
10. Chesapeake Bay-Bridge Tunnel (offshore)	Loss of habitat and feeding areas for fish and benthos. May adversely impact on larval transport associated with Chesapeake Bay plume. Loss of commercial and recreational boating. Retain due to long useful life.	11.42	Eliminated due to high cost plus environmental factors	
<u>C. PLANS CONSIDERED IN INLAND AREAS</u>				
11. Suffolk site	Saltwater intrusion into aquifer. 6,000 acres of woodland area lost. Two endangered animal species threatened. Possible effect on Hampton Roads airport. Eliminated from further consideration.			
12. Truck haul to abandoned borrow pits	Possible saltwater intrusion in ground water supplies. Capacity of available borrow pits small. Difficulties from an operational standpoint due to required movement of thousands of truck loads daily. Eliminated from further consideration.			

SUMMARY OF PROJECT FORMULATION
SCREENING PROCESS
 (Cont'd)

Plan	Initial Screening	Intermediate screening (a)		Final array of plans
		Cost per c.y. (b)	Comments	
13. Rail Haul to abandoned mining pits	<p>Groundwater resources at dredged material fill site can be jeopardized by percolation of dissolved salts from material into underlying strata. Fluid nature of material when dredged, requires settling and drying basin. Pollutants such as heavy metals may become part of the leachate which could contribute to contamination of local water resources. Sediment-laden runoff would increase sediment load in nearby rivers, affecting productivity and carrying capacity of rivers.</p> <p>Eliminated from further consideration.</p>			
<u>D. OCEAN PLANS CONSIDERED</u>				
14. Dam Neck Ocean Management Site plus existing Craney Island for unsuitable material	<p>37 miles from Craney Island. Existing placement site for navigation channels in Chesapeake Bay and Atlantic Ocean. Available for clean material from inner harbor per EPA.</p> <p>Retain for further screening.</p>	7.04	Environmentally acceptable. Retain	Retain (c)
15. Norfolk Management Site plus existing Craney Island for unsuitable material	<p>45 miles from Craney Island. District has requested EPA to designate site as a placement area.</p> <p>Retain for further screening.</p>			

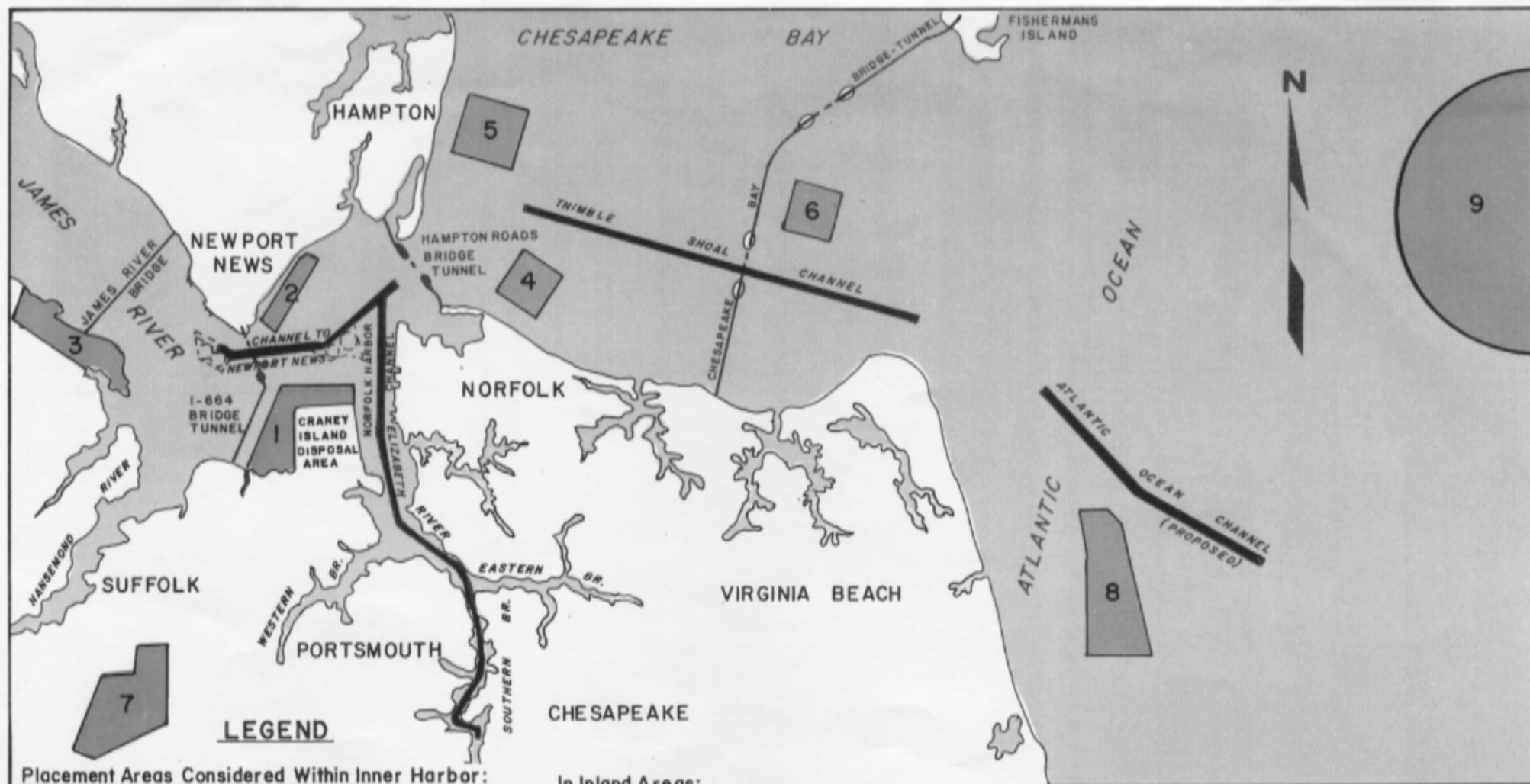
SUMMARY OF PROJECT FORMULATION
SCREENING PROCESS
 (Cont'd)

Plan	Initial Screening	Intermediate screening (a)		Final array of plans
		Cost per c.y. (b)	Comments	
16. Discharge of dredged material via pipeline to the sea	Require a 45-mile pipeline to sea with at least 12 booster stations. Portion of Craney Island required as a temporary placement area. Cost excessive. Eliminated from further consideration.			
17. Capping unsuitable material at sea	Capping of "buffer area" sediments from Elizabeth River may be feasible. Capping would require an EPA-designated ocean placement site with an EPA/Corps management plan that would permit the placement of "marginally suitable" dredged materials.			

(a) Including plans having life approaching 50 years.

(b) Based on maintaining existing channels and private access channels to docks, piers, etc., and deepening Elizabeth River and its Southern Branch to 40 and 45 feet.

(c) Ocean plan calls for initial placement in Dam Neck until site is filled to capacity; thereafter, placement would be at Norfolk Management Site.



Placement Areas Considered Within Inner Harbor:

- Raising Craney Island.
- Removing Material From Craney Island.
- 1 Expanding Craney Island.
- 2 Confined Site In Hampton Flats.
- 3 Confined Site In Ragged Island.
- Placing Material Alongside Channels.

In Chesapeake Bay:

- 4 Confined Site Off Ocean View.
- 5 Confined Site Off Buckroe Beach.
- 6 Confined Site Adjacent To The Bridge Tunnel.

In Inland Areas:

- 7 Confined Site In Suffolk.
- Truck Haul To Abandoned Borrow Pits.
- Rail Haul To Abandoned Mining Pits.

Ocean Placement:

- 8 In Dam Neck Management Site.
- 9 In Norfolk Management Site.
- Via Permanent Pipeline To Sea.
- Capping Unsuitable Material After Placement.

SCALE IN MILES



NORFOLK HARBOR AND CHANNELS, VIRGINIA
LONG - TERM DREDGED MATERIAL MANAGEMENT
(INNER HARBOR)

PLANS CONSIDERED

NORFOLK DISTRICT, CORPS OF ENGINEERS
JUNE 1990